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E7.3 10348
CR-130815

Bi-Monthly Progress Report
For the Period Beginning January 1, 1973
and Ending February 28, 1973

A. Title of Investigation:

An Interdisciplinary Analysis of ERTS data for Colorado Mountain Environments Using ADP Techniques

ERTS-1 Proposal Number: SR030/040

B. GSFC Identification Number: UN103
Principal Investigator: R. M. Hoffer

C. The only serious problem encountered during this bi-monthly reporting period occurred because an order for data for Scene ID 1047-17200 was not received. This data was originally ordered December 8, 1972 and reordered February 20, 1973 (Section J). Lack of data for this particular scene has caused some delays in the Ecological Inventory portion of the contract.

D. During this bi-monthly reporting period, a number of different analysis studies were carried out at LARS. These included (1) a study of the capability to spectrally identify cover type within topographic shadow areas, and examination of the spectral differences observed between topographic shadow areas and cloud shadow areas and certain water bodies; (2) a study was initiated to examine the spectral separability of clouds and snow cover; (3) the study involving mapping of the areal extent and temporal changes in snow cover was initiated, and (4) the spectral differentiation of certain lithologic units in the San Juan Test Site and computer mapping of the area resulted in some interesting findings.

In the topographic shadow study, we found that some spectral differences did exist for the various cover types within the shadow area, but these were so subtle that we believe that such differentiation within the shadow area will generally be unreliable. This would indicate that in future vegetation studies, it would be desirable to obtain the data under conditions of minimum shadow.

Differentiation of topographic shadow, cloud shadow, and water bodies proved to be very difficult and time consuming. In some cases the standing water bodies could be easily differentiated but in other cases it was extremely difficult to separate standing water from cloud shadow. Separation of the cloud shadow and standing water body was achieved with an accuracy of in excess of 90%, but only with difficulty. Further efforts will be made to study the reliability of ADP techniques when cloud shadow and topographic shadow features are present in the data.

(E73-10348) AN INTERDISCIPLINARY ANALYSIS OF ERTS DATA FOR COLORADO MOUNTAIN ENVIRONMENTS USING ADP TECHNIQUES Bimonthly Progress Report, 1 Jan. - 28 (Purdue Univ.) 8 p HC $3.00 CSCL 08F G3/13
N73-19347
Unclas 00348

With receipt of suitable data from both the San Juan and Indian Peaks sites, the study to spectrally separate snow from clouds was initiated. To date, data from three tapes has been analyzed (Scene ID: 1101-17203, 1119-17204, and 1136-17141). Both snow and clouds appeared to saturate the scanner on data from the San Juan Site (Scene ID's: 1101-17203; 1119-17204). However, snow and clouds did not appear to have saturated the scanner on the Indian Peaks data (Scene ID: 1136-17141), but spectral separation still appears unreliable. Major differences between these data are: (1) sun elevation of 33° for 1101-17203 versus 23° for 1136-171741 and (2) the amount and quality of snow cover, both of which are considerably greater for 1136-17141. Work will continue on this project with receipt of more data.

The project to map areal extent and variations in snow cover began with the receipt of data from Scene ID 1119-17204. A classification map showing the snow cover in this scene was generated and will be compared with data obtained later this winter and spring. Two of the initial classification maps were sent to INSTAAR for further analysis and interpretation. A method was also devised during this bi-monthly period for calculating irregular areas, such as watershed boundaries, using the LARSYS techniques. Snow cover within the primary study watershed was estimated with an accuracy of greater than 95%. Further evaluation of these techniques and results is underway.

The results of the geologic study are reported under Section E of this report.

D.2 Work at INSTAAR during the last bi-monthly period was primarily involved with instrumentation of the DCP, updating field data information and maps, and analysis of LARS generated computer maps for Scene ID: 1119-17204.

DCP instrumentation provides data in six channels which monitor temperature, net radiation, and solar radiation. Reformatting of platform output to readable format has been completed. In addition, a storage and retrieval system which facilitates easy access to any of the data has been set up.

All macrovegetation cover type maps have been transcribed to a base that is compatible with geomorphic and surface form data. The completed quads are being transferred to mylar transparencies at the same scale as the 7 1/2 minute USGS topo quads. It is expected that these will be completed in March.

The surface water and snow cover inventory has been completed. Currently this information is being inserted into the data storage/ retrieval system.

A computer program designed to generate shadow maps as a function of topography and sun angle has been completed. Shadow maps will be generated as digitized topographic map data from Purdue is received.

A computer map of the San Juan subframe has been received. Examination of this computer map reveals that in shadow free areas for which ground truth knowledge is available, one computer class corresponds to deciduous cover (quaking aspen and willow); one class corresponds to coniferous cover (Engleman spruce and sub-alpine fir); and a third class corresponds to areas containing mixed coniferous and deciduous cover or mixed coniferous cover.

Efforts over the next two months will be directed towards intergrating remaining ground truth into the storage and retrieval system and continued analysis of the existing subframe. Channels 7 and 8 of the DCP should be operable and the data obtained will be reformatted and inserted into the retrieval system. Preliminary analysis to determine accuracy of DCP data will also be initiated.

E. An area in the Southwestern corner of the San Juan Site was analyzed with data from Scene ID 1119-17204 to identify surface lithologic and physiographic features. Results from a supervised classification indicate good visual correlation with late Mesozoic and early Cenozoic shales and sandstones as they appear on a geologic map of the area. Additionally, Pleistocene and Recent alluvial deposits, including sand and gravel aggregate materials, are clearly separable when using LARSYS data and analysis techniques. With minimal manual analysis of the resultant ADP classification, surface location of coal-bearing strata can be interpolated within the Cretaceous lithologies of the area.

F. No reports, etc., were released during this bi-monthly period.

G. There were no changes suggested during this bi-monthly period.

H. Attached is an updated copy of the Standing Order Form, dated January 15, 1973.

I. Appropriate ERTS Image Description Forms are attached.

J. The second data request form for data from Scene ID 1047-17200, dated February 20, 1973 is attached.

K. As per written request from Goddard dated January 31, 1973 by Stanley C. Fredin, the following comments relate to NASA RB-57F Mission 228:

(1) Support during this mission was adequate for both San Juan and Indian Peaks Test Sites (Test Site 326).

(2) Data quality and delivery are both satisfactory.

(3) This particular set of data will be utilized to define specific hydrologic parameters necessary for the Hydrologic Inventory.

January 15, 1973 317/749-2052

Dr. Arthur Fihelly
NASA
Goddard Space Flight Center
Greenbelt, Maryland 20770

Dear Mr. Fihelly,

Please find enclosed Standing Order Forms for the three contracts UN103, UN127 and UN630 being performed by principal investigators in this Laboratory.

These forms primarily indicate a change requested in the product requirements. At the present time all have been on standing order for computer compatible tape, and it is now evident that sufficient data in this form has been received to carry on our research and to be more selective in future scene requests.

Please be aware that with the advent of the 73 growing season we intend to request again that certain of our test sites be put on standing order for tape.

Sincerely,

D. A. Landgrebe
Director

DAL:lkv

CC: M. F. Baumgardner
R. M. Hoffer
T. A. Martin
T. L. Phillips

5

ERTS 1 STANDING ORDER FORM

(See Instructions on Back)

DATE JAN 10 1973

GSFC ID NUMBER UN 103

PRINCIPAL INVESTIGATOR R. M. HOFFER

TELEPHONE NO. (317) 749-2052 ☐ NEW

SHIP TO: R. M. HOFFER
(NAME)
LARS / PURDUE
(AGENCY)
1220 POTTER DRIVE
(STREET)
WEST LAFAYETTE IN 47906
(CITY) (STATE) (ZIP)

☐ ADDITION
☑ CHANGE
☐ DELETION

CATALOGS DESIRED
STANDARD ☐ U.S. ☐ NON-U.S.
DCS ☐
MICROFILM ☐ U.S. ☐ NON-U.S.
☐ CHECK IF ADDRESS IS NEW

NDPF USE ONLY
D
N
ID
DTM
TM
TM APP

AREA NUMBER	GEOGRAPHIC POINTS		CLOUD COVER %	QUALITY	COVERAGE PERIOD		PROD		TICK MARK	QUANTITY	RBV BANDS			MSS BANDS				DELETE
	LATITUDE	LONGITUDE			START DATE	STOP DATE	TYPE	FORMAT			1	2	3	1	2	3	4	
FROM	4030N	10545W	5	F	07/23/72	03/31/74		M		1								
	4030N	10515W						T		3								
	3952N	10515W						P		1								
	3952N	10545W					D	9		1								
TO	4030N	10545W	5	F	07/23/72	03/31/74		M		1								
	4030N	10515W						T		3								
	3952N	10515W						P		1								
	3952N	10545W																
FROM	3807N	10752W	5	F	07/23/72	03/31/74		M		1								
	3807N	10645W						T		3								
	3715N	10645W						P		1								
	3715N	10645W					D	9		1								
TO	3807N	10752W	5	F	07/23/72	03/31/74		M		1								
	3807N	10645W						T		3								
	3715N	10645W						P		1								
	3715N	10752W			6													

GSFC 37-3 (7/72)

INVESTIGATOR'S COPY

ERTS IMAGE DESCRIPTOR FORM

(See Instructions on Back)

NDPF USE ONLY
D
N
ID

DATE March 1, 1973

PRINCIPAL INVESTIGATOR R. M. Hoffer

GSFC UN 103

ORGANIZATION LARS/Purdue University

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS*			DESCRIPTORS
	Geology	Hydrology		
1101-17203 M,D	X			Mountains, Annular Drainage, Dendritic Drainage, Hogbacks, Caldera, Fault
1101-17203 M,D		X		Clouds, Snow, Lakes
1119-17204 M,D	X			Mountains, Annular Drainage, Dendritic Drainage, Hogbacks, Fault
1119-17204 M,D		X		Clouds, Snowpack, Lakes, Frozen Lakes
1136-17141 M,D	X			Mountain Front, Cities, Dendritic Drainage
1136-17141 M,D		X		Clouds, Snowpack, Lakes
1173-17202 M,D	X			Mountains, Annular Drainage, Dendritic Drainage Hogbacks, Fault
1173-17202 M,D		X		Clouds, Snowpack, Frozen Lakes

*FOR DESCRIPTORS WHICH WILL OCCUR FREQUENTLY, WRITE THE DESCRIPTOR TERMS IN THESE COLUMN HEADING SPACES NOW AND USE A CHECK (✓) MARK IN THE APPROPRIATE PRODUCT ID LINES. (FOR OTHER DESCRIPTORS, WRITE THE TERM UNDER THE DESCRIPTORS COLUMN).

MAIL TO ERTS USER SERVICES
CODE 563
BLDG 23 ROOM E413
NASA GSFC
GREENBELT, MD. 20771
301-982-5406

1

GSFC 37-2 (7/72)

Return to Tina (gls)

20 Feb 73
Bill Weiss

ERTS DATA REQUEST FORM
560-213 (7/72)

NDPF USE ONLY

D ______
N ______
ID ______
DTM ______
TM ______
TM APP. ______

1. DATE 2/19/73

5. TELEPHONE NO. 317-749-2052 ☐ NEW

2. USER ID UN 103

6. CATALOGUES DESIRED

STANDARD ☐ U.S. ☐ NON-U.S.

DCS ☐

MICROFILM ☐ U.S. ☐ NON-U.S.

4. SHIP TO:

ADDRESS Roger M. Hoffer ☐ NEW
Laboratory for Applications
of Remote Sensing

1220 Potter Drive
Lafayette IN 47906

ADDDHHMMS OBSERVATION IDENTIFIER	C CENTER POINT COORDINATES	B SENSOR BAND	P PRODUCT TYPE	F PRODUCT FORMAT	T TICK MARKS	NN NUMBER OF COPIES	A AREA
1047-17200	N37-30/ W107-26	7	B	T		5	U
1047-17200	N37-30/ W107-26	7	C	T		2	U
			4				